



INTERNATIONAL

INVITED SESSION SUMMARY

Title of Session:

Low-energy space cooling and ventilation: environmental, resilient and technological aspects

Name, Title and Affiliation of Chair:

Giacomo Chiesa, Ph.D., Assistant Professor, Politecnico di Torino, Department of Architecture and Design

Details of Session (including aim and scope):

Space cooling and ventilation are consistent voices in building energy balances with a relevant effect on the national balance too. Furthermore, cooling energy consumptions are growing significantly and are expected to overpass space heating consumptions during the next 50 years. Several issues are related to this increase such as changes in the culture of comfort and in comfort expectations, international style of buildings, rise in internal gains, urban heat island and climate changes.

Alternative low-energy solutions are needed in order to invert this trend, reduce energy consumptions and GHG emissions for space cooling and ventilation, and promote solutions for a resilient environment.

Passive and low-energy cooling strategies are potential alternatives to current diffused solutions, but their potential is local specific, they need for an attentive design approach, and, in several cases, they are not directly included in current standards.

The session aims at reporting current advancements in the field, with special regards to residential and small office units, including but not limited to the following issues:

- Resilient strategies to space cooling under the effect of climate changes and urban heat island;
- Strategies to study the expected impact of urban heat island and climate changes with special regards to the summer energy needs;
- Heat gain prevention strategies (e.g. advanced shading systems; cool roofs; cool materials; advanced studies on solar radiation by also considering urban effects);
- Heat gain mitigation strategies (e.g. PCM and massive architectures);
- Heat gain dissipation systems through thermal sinks (controlled natural ventilation – comfort, environmental and structural ventilation; evaporative cooling; earth-to-air heat exchangers; radiative cooling);
- Solar cooling systems;
- Hybrid cooling systems;
- Advanced control systems and ICT aspects for low-energy cooling technologies.

The session concerns: case studies, simulation models, laboratory and in situ testing, and design recommendations.

Main Contributing Researchers / Research Centres (tentative, if known at this stage):**Website URL of Call for Papers (if any):****Email & Contact Details:**

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